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DOE Announces $60 Million in Projects to Accelerate Scientific Discovery through Advanced Computing

WASHINGTON, D.C. — The U.S. Department of Energy's (DOE) Office of Science today announced approximately $60 million in new awards annually for 30 computational science projects over the next three to five years. The projects are aimed at accelerating research in designing new materials, developing future energy sources, studying global climate change, improving environmental cleanup methods and understanding physics from the tiniest particles to the massive explosions of supernovae.

"Advanced computing is a critical element of President Bush's American Competitiveness Initiative and these projects represent an important path to scientific discovery," DOE Under Secretary for Science Raymond Orbach said. "We anticipate that they will develop and improve software for simulating scientific problems and help reduce the time-to-market for new technologies."

Sponsored by the DOE's Scientific Discovery through Advanced Computing (SciDAC) program, SciDAC-2 will bring together some of the nation's top researchers at the department's national laboratories and U. S. universities to create the software and infrastructure needed to help scientists effectively utilize the next generation of supercomputers. DOE's supercomputers tackle complex scientific challenges – some of which can only be studied through high performance computation and simulation. These projects, selected from a total of 240 proposals, involve 70 institutions and hundreds of researchers and students.

Seventeen science application projects will receive approximately $26.1 million in awards annually to study problems ranging from quarks to genomes to astrophysics. Two new scientific areas to be addressed under SciDAC-2 are groundwater transport of underground contaminants, an important factor in DOE's environmental cleanup mission, and computational biology focused on how biological systems may be tapped to help provide new energy sources or help with environmental remediation. These new project areas will complement research in fusion energy, global climate, turbulence, stress corrosion cracking, computational chemistry and quantum chromodynamics.

In support of these scientific applications, approximately $24.3 million in annual awards will allow SciDAC-2 to establish nine Centers for Enabling Technologies. Multidisciplinary teams will be led by national laboratories and universities and will focus on meeting the specific needs of SciDAC science applications researchers as they move toward petascale computing. The centers will specialize in applied mathematics, computer science, distributed computing or visualization and will be closely tied to specific science applications.

SciDAC-2 will also increase the presence of the program in the academic community by creating four university-led SciDAC institutes with thirteen participating universities. The institutes will receive

approximately $8.2 million in awards annually. Through hands-on workshops and tutorials, the SciDAC institutes will help a broad range of researchers prepare their applications to take advantage of the increasing capabilities of supercomputing centers around the country as well as help foster the next generation of computational scientists.

SciDAC-2 expands on the original SciDAC program by collaborating with the National Science Foundation (NSF) and DOE's National Nuclear Security Administration (NNSA) as new funding partners. The NSF is contributing nearly $3 million a year to the Open Science Grid that supports the large, international physics collaborations supported by DOE and the NSF. The NNSA is contributing nearly $3 million a year for physics and materials research.

The newly announced projects build on the success of the original SciDAC projects launched in 2001. Those projects achieved a number of scientific breakthroughs, including:

- For the first time, astrophysicists simulated the conditions which trigger massive stellar explosions know as Type 1a supernovae, which are critical to understanding the nature of our universe.
- Climate modeling tools developed and improved under SciDAC enabled U.S. climate scientists to make the largest contribution of global climate modeling data to the world's leading body on climate studies, the Intergovernmental Panel on Climate Change.
- A better understanding of combustion, which provides 80 percent of the energy used in the United States. Scientists created the first laboratory-scale 3-D flame simulation, an achievement which will likely help improve efficiency and reduce pollution.

Additional information on all 30 SciDAC projects, along with descriptions of the Institutes, Centers for Enabling Technology and Science Applications, can be found at http://www.scidac.gov/. Researchers from industry, academia and laboratories can also get information and advice from the SciDAC Outreach Center at http://outreach.scidac.gov/.

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